

Appl. No. 10/049,230
Amdt. Dated 12/19/2003
Reply to Office Action of 09/23/2003

REMARKS/ARGUMENTS

Applicants again wish to thank the Examiner for his courtesy telephone call prior to issuance of the outstanding Office Action.

In the Office Action, the Examiner has rejected all of the pending independent claims in the application, i.e., claims 8, 31, and 37, under 35 U.S.C. § 103(a) as being unpatentable over Gail et al. (U.S. Patent No. 5,752,805) in view of Aksit et al. (U.S. Patent No. 6,406,027). In response to the Office Action, Applicants have amended independent claims 8, 31, and 37 to more particularly claim Applicants' invention.

In the amended independent claims, Applicants now more particularly claim that each section of strands of the aramid fibers individually runs in a loop shape around the core and, therefore, as is also claimed, the sections of the strands are individually secured between the core and the clamping section. In Applicants' invention, the problem of using aramid fiber strands as bristles is economically solved. See specification at para. 0004. The reason that aramid fibers, though desirable for use as brush seals, are difficult to utilize is their extremely small diameter when compared to materials commonly used for brush seals, e.g., ceramic materials, particularly silicon carbide, or highly alloyed metallic materials, as disclosed in the primary reference cited by the Examiner, i.e., Gail et al. As disclosed in Applicants' specification, each aramid fiber section, or "bristle", has a thickness of between a few thousandths and a few hundredths of millimeters. See specification at para. 0017. As claimed, in Applicants'

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invention, each aramid fiber bristle individually extends around the core and is individually secured between the clamp and the core by frictional clamping with a prestressed clamp.

Applicants respectfully submit that even if the Gail et al. and Aksit et al. references can be combined, the combination still does not disclose individual aramid fiber bristles secured between a core and a clamp. Gail et al., the disclosure of which Applicants are very knowledgeable about since it is assigned to the same Assignee as the present application, provides no disclosure for using aramid fibers, as acknowledged by the Examiner in the Office Action. In Aksit, et al., as the Examiner correctly noted, aramid fibers are disclosed for a brush seal. However, in Aksit, individual aramid fibers are not wound around a core. In fact, Aksit cannot disclose winding individual fibers because Aksit explicitly states that it is "virtually impossible to handle and secure individual small-diameter aramid filaments to a bristle holder." See col. 2, lines 34-36. Whereas Aksit states that it would be desirable to use aramid fibers, it clearly states that the known problem with using aramid fibers is that they cannot be individually handled and secured to a bristle holder. See col. 2, lines 28-36. Aksit solves the problem by using a yarn of aramid filaments.

As disclosed in Aksit, the brush seal 14 includes a bristle holder 18 and filament-yarn bristles 20 secured to the bristle holder. A filament-yarn bristle is specifically defined as "a bristle consisting of, or consisting essentially of, a

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filament 22 supplied to a brush-seal manufacturer together with other filaments 22 in the form of a yarn 24, 26, 28, and 30." Typically, each of the bristles has a diameter of less than 0.001 inch and each yarn contains from between 1,000 to 2,000 bristles 20. See col. 3, lines 20-33 and Figure 2. Therefore, in Aksit, because the individual aramid fibers cannot be handled and secured to the bristle holder, Aksit secures yarns of filaments to the bristle holder. If each bristle has a diameter of approx. 0.001 inch and each yarn contains between 1,000 to 2,000 bristles, each yarn is between 1-2 inches in diameter. Thus, Aksit secures yarns of filaments with a diameter of between 1-2 inches to the bristle holder. In contrast, in Applicants' invention, individual fiber bristles, each with a thickness of between a few thousandths and a few hundredths of millimeters, are secured to the bristle holder.

In the Office Action, the Examiner argues it would have been obvious to configure the bristles of Gail to be made from aramid filaments as taught by Aksit in order to provide bristles that have high strength. Applicants do not disagree that it was known to be desirable to have bristles of high strength. However, the problem that Aksit solved and that the present invention solves is how to secure the aramid fibers to the bristle holder.

Applicants respectfully submit that if the teaching of Aksit is combined with Gail, yarns of fibers are secured to the bristle holder of Gail and, thus, the combination does not disclose Applicants' invention of individually securing fiber

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bristles to the holder. As discussed above, Aksit's yarns each have a diameter of between 1-2 inches. In contrast, Applicants' bristles each have a thickness of between a few thousandths and a few hundredths of millimeters.

Applicants also respectfully submit that it is improper to argue that Gail discloses individual fibers secured to a bristle holder and that it would have been obvious merely to substitute the aramid fibers of Aksit for the ceramic or metallic bristles of Gail. As discussed above, whereas it was desirable to use aramid fibers, the problem to be solved was how to handle and secure them. Applicants respectfully submit that there would be no reasonable expectation of success for using the structure of Gail in order to attempt to secure individual aramid fiber bristles to the bristle holder. Gail was used to secure relatively very large diameter fibers of ceramic and metal. Aksit acknowledges that in the prior art, of which Gail is a part, it was "virtually impossible" to handle and secure individual small-diameter aramid filaments to a bristle holder. Applicants respectfully submit that, as evidenced by Aksit, there would have been no reasonable expectation of success to one having ordinary skill in the art at the time the invention was made that the structure of Gail could be utilized to individually secure aramid fiber bristles to a bristle holder. In order for a combination of references to be proper, there must be a reasonable expectation of success. See M.P.E.P. ¶2143.02. Therefore, Applicants respectfully submit that

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an argument to combine Gail with Aksit to disclose securing individual aramid fiber bristles to a bristle holder would be improper.

Applicants also respectfully submit that, not only is it improper to combine Gail and Aksit, but that Gail does not disclose a prestressed clamping section, as argued by the Examiner. In Applicants' invention, the individual aramid fiber bristles are exclusively secured by frictional locking which is dependent on an amount the clamping section is prestressed. A prestressed clamping section is required because of the extremely small diameter aramid fiber bristles. In Gail, relatively large diameter fibers of ceramic or metal are used. There is no need for a prestressed clamping section.

In the Office Action, the Examiner points to col. 5, lines 61-64 in Gail for disclosure related to a prestressed clamping section, exclusive securing of the strands by frictional locking, and the frictional locking being dependent on an amount the clamping section is prestressed. However, Applicants respectfully disagree that Gail discloses these features. All that is disclosed in Gail at the Examiner's citation is that a bristle bundle B is gripped by a clamping tube which is "bent essentially in a U-shape around a core ring". (emphasis added). Applicants respectfully submit that there is no disclosure related to the bent U-shape clamping tube being prestressed. Also, there is no disclosure related to frictional locking being dependent on an amount the clamping section is prestressed. Additionally, there is no disclosure related to prestressing the

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clamp by elastic cross-sectional widening. Even if the Examiner gives little patentable weight to this feature in the apparatus claims, this method step is particularly claimed in independent method claim 37.

For at least the above reasons, Applicants respectfully submit that all of the features of amended independent claims 8, 31, and 37 are not disclosed or suggested in either Gail or Aksit, either alone or in combination. Therefore, Applicants respectfully submit that the application is now in condition for allowance. If there are any questions regarding this Amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

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If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response. Please charge any such fee or any deficiency in fees, or credit any overpayment of fees, to Deposit Account No. 05-1323 (Docket 038741.50870US).

Respectfully submitted,

CROWELL & MORING LLP

Dated: 12/19/03

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12/19/2003

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